

# NASA TECH BRIEF



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## Vapor Pressure Measured With Inflatable Plastic Bag

**The problem:** Devising a convenient method for measuring the vapor pressures of a large number of samples of materials having relatively low vapor pressures (e.g., acetamide, acrylamide, and benzoic acid). The method is to be used for initial measurements, and high accuracy is not of primary consideration.

**The solution:** Use of a deflated plastic bag in a vacuum chamber to capture vapors from the sample being evaluated. Visual observation of the vapor-inflated bag under increasing external pressure yields data from which vapor pressure may be approximated.

**How it's done:** The sample whose vapor pressure is to be determined is placed inside a 0.25-mil-thick plastic bag fitted with a vent tube. This bag is positioned inside a bell jar and the vent tube is connected to an externally operated valve leading to a vacuum pump. Both the bell jar and the bag are then evacuated for several hours to outgas the bag. When outgassing is completed, the valve is closed to seal the bag so that it can be inflated with vapor from the material. When the system reaches a steady-state condition, air is vented into the bell jar. The vapors condense and the bag begins to collapse when the air pressure in the bell jar equals the vapor pressure of the material. This collapse is observed visually, and the pressure in the

chamber is read from a Pirani gage. Temperature is measured by four thermocouples placed near the bag. If greater accuracy is desired, the bag and the chamber may be reevacuated and the procedure repeated until reproducible results are obtained.

### Notes:

1. Under ideal conditions, this method is accurate to within 10 microns for vapor pressures above 10 microns.
2. Factors which may introduce errors in the procedure include improper outgassing of the bag, sample contamination, and improper observation of bag collapse.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Goddard Space Flight Center  
Greenbelt, Maryland, 20771  
Reference: B65-10136

**Patent status:** NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Geophysics Corporation of America  
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